

Volume 3. Air Operator Technical Administration

CHAPTER 10. EMERGENCY EVACUATION AND DITCHING DEMONSTRATIONS

SECTION 3. ABORTED TAKEOFF DEMONSTRATION PROCEDURES

1711. THE DEMONSTRATION TEAM. The FAA team responsible for evaluating the emergency evacuation demonstration shall be headed by a team leader. For an initial certification, the certification project manager (CPM) serves as the demonstration team leader. When a demonstration is conducted by an existing operator, the district office manager will normally assign one of the operator's principal inspectors to serve as the demonstration team leader. Every effort should be made to have cabin safety inspectors act as team leaders for the emergency evacuation and ditching demonstration or at least be involved in the planning and conducting of evacuation and ditching demonstrations. This may not always be possible because of the workload of some cabin safety inspectors. When a cabin safety inspector is not available, seek assistance from other experienced inspectors. Assign the team leader as early as possible in the process, and no later than the beginning of phase three. The team leader is responsible for planning, conducting, and evaluating the emergency evacuation demonstration. He/She serves as the focal point and central spokesperson for FAA on all matters pertaining to the demonstration. Assign other members of FAA team as needed and ensure these members consist of operations, cabin safety, maintenance, and avionics inspectors familiar with Title 14 of the Code of Federal Regulations (14 CFR) part 121 operations and applicable regulatory requirements.

1713. PREDEMONSTRATION MEETING WITH OPERATOR. After reviewing and thoroughly evaluating the operator's plan (phase three), the FAA team leader should meet with the operator's evacuation demonstration coordinator. During this meeting the FAA team leader should accomplish the following:

- Review the operator's plan and ensure that he/she is thoroughly familiar with the applicable criteria to be used during the demonstration.
- Ensure that the operator is aware of its responsibilities regarding participant safety including provisions for safety observers, stands, ramps, padding, and ambulance coordination, as applicable.
- Review the method and signals for initiating the demonstration and timing criteria.

- In coordination with the operator, determine the signal to be used to terminate the demonstration such as an air horn, or some other clear, distinguishable audible signal. (Experience has demonstrated that a whistle blast may not be adequate.) A suitable device should be agreed upon as early as possible in the planning stage, and tested to assure its adequacy.
- Resolve any unanswered questions or issues the operator may have before conducting the demonstration.

1715. FAA TEAM PLANNING. The FAA team leader must conduct a meeting with FAA team members to assure each team member has a specific assignment during the demonstration. This includes timekeeping, position (inside or outside the airplane), and inspecting the emergency equipment, the airplane, and any applicable documents. The team leader should distribute an aircraft diagram to each inspector showing their assigned locations for the demonstration. The team must determine which emergency exits shall be opened and which other exits will be blocked.

1716. CREW CRITERIA. Select "typical" crewmembers to be used in the demonstration from the list provided by the operator. Normally, typical crewmembers should not include emergency procedures instructors, supervisors, check airmen, union safety representatives, or others who may have an above average level of experience or exposure to emergency evacuation requirements. The qualifications of the crewmembers used in the evacuation demonstrations should be consistent with qualifications of line crewmembers. Normally, crewmembers used in these demonstrations should have been "line crewmembers" for the last 2 years. In addition, whenever possible crewmembers should not have been used in a demonstration within the last 6 months. There are smaller airlines where this may not be possible. When this is the case, document and include the former experience in the report regarding the demonstration. When the FAA determines that crewmembers to be used in the evacuation demonstrations have been allowed to "practice" opening the doors/exits, they should not allow these crewmembers to be used in the evacuation demonstration, unless the operator's FAA approved training program includes this

additional training. "Practice" is any training conducted outside of normally scheduled training programs.

A. The air carrier should present a minimum of two complete crews for the demonstration(s). During the consultation with the regional office and AFS-200 through the certificate holding district office (CHDO) that is required as a result of two demonstration failures, the lack of trained crewmembers for future demonstrations should be discussed. It is possible that in the case of equipment failures that are not related to airline training or procedures, such as a slide that failed to inflate due to an equipment malfunction. This determination should be coordinated by the POI with the regional office, through the CHDO.

B. It is very important that the "back-up" crewmembers who may be used if the first demonstration fails are not given any information about the first demonstration. Sometimes this is best accomplished by having these crewmembers isolated in an area which is physically removed from the first evacuation demonstration. However, when these back-up crewmembers are not held in an area away from the demonstration, they should stay in a group with an FAA inspector present so the inspector can ensure they are not given any information about the first demonstration.

C. When an airline is new, typical line crewmembers may not be available. When this is the case, the carrier must train the first cadre of flight attendants; it is quite possible that these flight attendants will also be instructors. Nevertheless, they should not be given instruction or experience that will not be given to flight attendants who will be expected to serve as flight attendants on this aircraft on the line. For example, they should not have had "train the trainer" training until after their participation in the evacuation demonstration. Chief flight attendants or flight attendant managers who are in charge of the air carriers over all flight attendant programs should not be used as crewmembers during evacuation and ditching demonstrations, unless no other flight attendants have been hired.

D. The FAA encourages whenever possible the use of separate crewmembers for the emergency evacuation demonstration and the ditching demonstration. Some new entrant air carriers may not be aware of the stress level the crews are facing by participating in these types of demonstrations. Additionally, by providing separate crewmembers for each demonstration, it provides the FAA with a better assessment of the training program. In the event of a non-flight attendant demonstration failure (e.g., equipment failure), it is recommended that a new flight attendant crew be selected from the remaining flight attendant group.

E. The team leader must make certain each team member is aware of the signal to be used to initiate the demonstration and the signal to be used to terminate the

demonstration. During the FAA meeting, review regulatory requirements and demonstration criteria to assure common understandings.

1717. SELECTING EXITS.

A. The team leader should evaluate the air carrier's procedures when determining the exits to be used and blocked. Fifty percent of the required floor level exits must be opened and the slides or slide/rafts ready for use within 15 seconds. The remaining exits must be blocked. If emergency evacuation procedures dictate that flight attendants are assigned to open non-floor level exits as part of the flight attendant duties, these exits must be opened as part of the demonstration within the same 15 seconds. These floor-level exits (doors) and non-floor-level exits (windows or plugs) may be used provided they are designated as exits to be opened by a flight attendant in the company's evacuation procedures. Ventral (stairs) and tail cone exits should not be used unless they are paired with another exit. If there is any doubt as to which exits are paired, consult the Aircraft Certification Office (ACO) responsible for the type certificate of the aircraft make/model. In airplanes having an even number of exits, not more than 50 percent of the total number of exits and slides may be opened and deployed. When an airplane has an odd number of emergency exits a careful determination should be made before subtracting or adding exits. The exits which are used in the demonstration do not have to be part of an exit pair. Team leaders in charge of the evacuation demonstration should consult with the CHDO and with AFS-200 before making a determination of adding or subtracting an exit.

B. Any emergency exit assigned to a flight attendant as part of his or her evacuation duties may be selected for use during the evacuation demonstration. For the purpose of this document, a primary exit is one that is assigned to a flight attendant as the first exit he/she is assigned to open in the event of an emergency. A secondary exit is the next exit to which a flight attendant is assigned. For example, a flight attendant manual stipulates that a flight attendant sitting next to the floor level exit at L1 would open that exit and then proceed to the floor level exit at R1 and open that exit. When this is the case the primary exit is the L1 door and the secondary exit is the door at R1. If the first exit is blocked then the flight attendant would proceed to the secondary exit and open it and then inflate the slide or slide/raft. When the flight attendant opens the first exit, the only actions required at the second floor level exit (secondary exit) are to assess conditions and to redirect passengers away from the unusable exit. Then the flight attendant should return to the usable exit and command passengers out of the usable exit. For additional discussion of primary and secondary exits, inspectors may want to refer to HBAF 96-04, "Guidelines for Training Flight Attendants Assigned to Open More Than One Door During an Aircraft Emergency Evacuation."

C. The team leader must carefully review the operator's

emergency evacuation procedures. When deciding which doors or exits are to be opened during a partial demonstration, the FAA must not select a door that is not designated as a primary flight attendant duty to open, or a secondary door or exit that could not possibly be opened and the slide or slide/raft, if applicable, be ready for use in 15 seconds. For example, if a flight attendant operated his or her assigned floor level exit and then proceeded to open an overwing exit, that would be considered unrealistic to accomplish operating both types of exits and still meet the 15 second time limit. However, it would be reasonable, at the conclusion of the timed portion of the emergency evacuation demonstration, for a flight attendant to operate the overwing exit to test the validity of their training as well as the mechanical reliability of the exit. For example, some aircraft are equipped with slides that deploy from the overwing exit. This is an opportunity to ensure the exit operates properly and the slide deploys per manufacturer's specifications. If the overwing exit or the slide failed to operate in accordance with manufacturer's specifications, it would not result in a failure of the emergency evacuation demonstration, but rather the failure would need to be addressed with air carrier personnel and appropriate action taken. Traditionally, one floor level exit from each exit pair was selected to be demonstrated. While this is still an acceptable method, other exit combination possibilities exist and should be considered. For example, if an aircraft is configured with four flight attendant jumpseats adjacent to the four floor level exits, it would be permissible to have one exit pair blocked and the other exit pair be demonstrated. This type of combination would meet the requirement of opening 50 percent of the exits. Past precedence has discouraged one flight attendant from operating two floor level exits due to the 15 second time constraint; however, this does not exclude or prohibit the team leader from selecting both exits within the pair to be opened and the slides or slide/rafts deployed. The team leader should use good judgment if this option is selected. Careful consideration to the air carrier's evacuation procedures must be thoroughly evaluated if this option is to be used. This decision should be coordinated with AFS-200. The operator should identify exit pairs in the interior configuration diagram. After determining which exits will be used, the team should not divulge that information to the operator.

1719. BLOCKING EXITS. The operator should propose the method for blocking exits. The demonstration team must review the proposal to determine its acceptability. The method that is selected for blocking of exits must require flight attendants to assess the exit.

A. The following are examples of acceptable methods of blocking exits during an emergency evacuation demonstration:

(1) To simulate a fire at blocked exits, secure a chemical luminary/cylume stick (glow stick) to the exterior

of each exit so that it is visible to a flight attendant who is assessing the exit. At the initiation signal, designated inspectors will pull lines attached to the glow sticks to remove them from the exits which are to be used and leave the glow sticks on the exits which are not to be used.

(2) Secure red lights to the exterior of each exit so that when illuminated, they are visible to a flight attendant who is assessing the exit. At the initiation signal, the lights at exits which are not to be used will be illuminated to simulate fire at blocked exits.

(3) Secure a visual indicator to the interior side of each exit. Prior to the demonstration, determine what conditions/visual signals the flight attendants will see during their assessment of the exit that will indicate that the exit is blocked or usable. The method selected must ensure that flight attendants have no indication of which exits will be blocked and which exits will be usable, prior to the initiation signal.

(4) Position a flashlight on the exterior of each exit so that when it is illuminated, it is visible to a flight attendant who is assessing the exit. At the initiation signal, designated Inspectors will illuminate the flashlights to simulate fire at the exits which are not to be used.

B. When a method of blocking exits has been determined, the FAA team leader must notify the company's project coordinator of FAA concurrence with the method and ensure the company will provide the required maintenance and logistical support to prepare the exit blocking methods.

C. The crewmembers should see the blocking signal on the aircraft in the same ambient conditions that will be present during the demonstration. This could be in addition to a video, a photo, or a demonstration of the signal in a briefing room. It is very important that the flight attendants have the opportunity to see exactly what they will be seeing on the aircraft during the evacuation demonstration.

1721. INITIATION SIGNAL.

A. Timing of the emergency evacuation demonstration is very important. Fifteen seconds is allowed for the completion of a successful demonstration. Fifty percent of the floor level exits must be opened within 15 seconds and the slide or slide/rafts be ready for use. The timing should start at a prearranged signal. The signal should be agreed upon by the FAA and the operator. It is essential that FAA team members be aware of the demonstration initiation signal. The operator should propose a method which provides the same initiation signal for participants inside the airplane and FAA team members outside the airplane. The preferred method is for a company employee to interrupt the airplane's normal source of power by one of the following

actions:

- (1) Disconnecting, or turning off an external source of power or a ground power unit
- (2) Disconnecting or turning off the auxiliary power unit
- (3) Power interruption from the cockpit

B. This method of initiating the demonstration provides a clear initiation signal in the following ways:

- Inside the airplane, the flight attendants and FAA team members will observe the normal cabin lighting extinguish followed by the illumination of the emergency lighting system as their signal to commence the evacuation demonstration. It should be noted that these are not simultaneous events and there could be a second or two delay between the cabin lights extinguishing and the illumination of the emergency lighting system. For timing purposes, the demonstration commences when the cabin lights are extinguished.
- Outside the airplane, FAA observers (stationed at each exit) and the team leader (who serves as the timekeeper) will observe the external lights (for example, taxi lights, anti-collision lights, position lights, and logo lights) extinguish. This is the signal to initiate the timing and other necessary observation actions of the FAA team.
- The timing stops when that exit and slide or slide/raft is ready for use.
- Timing for slide readiness should be done from outside the aircraft and stops when the slide or slide/raft is ready for use.
- Timing for stair readiness should be done from outside the aircraft and should stop when the stairs are fully extended and the bottom is within 6 inches of the ground.
- Timing of exits not equipped with an escape means is often done better from the inside of the airplane. The operator must follow their procedures as provided in the appropriate parts of the manual. The inspector should insure that the exit is ready for use and then stop the timing.
- The timing stops for evacuation demonstration when the designated exits have been opened and the slides or slide/rafts are ready for use.

C. When there is no crewmember assignment to open an exit, the team leader may still require a crewmember (either a flight attendant or a flight deck crewmember) to open these exits; however this should be not be part of the timed evacuation demonstration. This is one method of determining that the operator's training and procedures are adequate for the airplane and are consistent with the intent

of 14 CFR part 121 § 121.291. This requirement could be needed when the aircraft is equipped with stairs, gull wings, overwing exits with slides, tailcones, or when the opening mechanism is new. The team leader could establish a time limit for opening these "unassigned" exits.

D. Ensure the crewmembers are briefed and aware of the initiation and blocking signals. It is recommended the crewmembers see and/or hear the initiation signal and the exit blocked signal on the aircraft in the same ambient conditions that will be present during the emergency evacuation demonstration. It is particularly important for the flight attendants to be familiar with the blocking signals. The blocking signal must be clear, specific, unambiguous and placed in the same location and position as they will find during the evacuation demonstration. It would be permissible for flight attendants to assess their exits for familiarity with the blocking signal.

1723. PARTICIPANTS. Due to the complexity involved in conducting an emergency evacuation demonstration, only those individuals who have a genuine need or concern should be present during the demonstration. Examples of persons who have a genuine need or concern would be representatives from the air carrier's training department, aircraft manufacturer, or slide manufacturer. Interested but unessential personnel may present hazards, interfere, or in other ways affect the outcome of the demonstration.

A. The operator is responsible for all non-FAA personnel who observe the demonstration. Those not directly involved in the demonstration should be kept at a reasonable distance from the airplane by some means such as ropes or lines.

B. The FAA team leader is responsible for FAA personnel who observe the demonstration. FAA observers should be limited to those who are required to evaluate the conduct of the demonstrations or need to be involved for specific reasons such as the following:

- FAA inspectors from other offices whose operators will be acquiring the same or similar type aircraft as the one being demonstrated
- FAA inspectors completing on-the-job-training (OJT) (The CHDO is encouraged to communicate its up-coming certification activities to allow other FAA inspectors to observe the demonstration for completion of OJT.)
- Regional or headquarters officials or designees
- FAA personnel from the Certification Directorate, the Flight Operations Evaluation Board (FOEB), the Aircraft Evaluation Group (AEG), or any other FAA office concerned with technical or engineering components of the aircraft

1725. PREDEMONSTRATION INSPECTION. Before the demonstration, the FAA team must inspect the airplane, emergency and safety equipment. The airplane must be

configured and equipped for takeoff in accordance with the operator's manuals and procedures. The airplane must be configured in the proposed full passenger seating configuration with all appropriate emergency and safety equipment installed. The team must inspect each of the following items to ensure regulatory compliance:

- Hand fire extinguishers for crew, passenger, and cargo compartments (part 121 § 121.309(b) and (c))
- Protective breathing equipment (§ 121.337)
- First aid equipment (§ 121.309(b) and (d))
- Crash ax (§ 121.309(b) and (e))
- Megaphones (§ 121.309 (b) and (f))
- Interior emergency exit markings (§ 121.310(b))
- Flotation devices or life preservers (§ 121.339(a)(1), § 121.309(b), and § 121.340)
- Lighting for interior emergency exit markings (§ 121.310 (c))
- Emergency light operation (§ 121.310(d))
- Emergency exit operating handles (§ 121.310(e))
- Emergency exit access (§ 121.310(f))
- Exterior exit markings (§ 121.310(g))
- Exterior emergency lighting and escape route (§ 121.310(h))
- Floor level exits (§ 121.310(i))

- Additional emergency exits (§ 121.310(j))
- Ventral or tail cone exits (§ 121.310(k))
- Portable lights (§ 121.310(l))
- Seats, safety belts, and shoulder harnesses (§ 121.311(a), (c), (e), and (f))
- Emergency equipment required for extended over-water operations (§ 121.309(b) and § 121.339)
- Public address system (§ 121.318)
- Passenger information signs/placards (§ 121.317)
- Airplane fire detection and protection system (operational test)
- Passenger information cards (§ 121.571(b))
- Cockpit escape system (14 CFR part 25 § 25.805)
- Slides and sliderafts (§ 121.309(b) and § 121.310(a))

FYI: For the purpose of a partial evacuation demonstration only, the slides may be beyond scheduled inspection criteria. However, the operator must request this option in the demonstration plan and state that the operator accepts full responsibility for any failure of the demonstration due to a malfunction of the slides. The FAA will have the option to either accept or deny this proposal.

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FYI: Stands or ramps may be appropriately placed for use by evacuees to descend from the wing to the ground (part 121, Appendix D (a)(3)). They should be inspected for structural integrity and security. Other safety equipment such as mats may be placed on the ground to protect participants in reaching the ground. If stands or ramps are to be used, they must be appropriately placed at both overwing exits because at the time of their placement the company will not know which exits will be used or blocked.

1727. PREDEMONSTRATION BRIEFINGS. Before the actual demonstration, three separate briefings should be conducted for the following participants:

- Crewmembers involved in the demonstration
- Passenger participants (if applicable)
- The FAA team

A. The company's evacuation demonstration coordinator should provide crewmembers with certain information regarding the demonstration. The coordinator should brief the participants on key objectives and aspects of the exercise including but not limited to a clear understanding of the artificial nature of the exercise. The FAA team leader must attend this briefing to resolve any questions to ensure

the following information is included:

(1) The purpose of the demonstration is to evaluate the following:

- The effectiveness of the company's training program as reflected by the crewmembers' actions
- The adequacy of the company's emergency procedures
- The effectiveness and reliability of the airplane emergency equipment

(2) The initiation signal which begins the demonstration must be clearly specified. Ensure the crewmembers are briefed and aware of the initiation and blocking signals.

It is recommended the crewmembers see and/or hear the initiation signal and the exit blocked signal on the aircraft in the same ambient conditions that will be present during the emergency evacuation demonstration. It is particularly important for the flight attendants to be familiar with the blocking signals. The blocking signal must be clear, specific, unambiguous and placed in the same location and position as they will find during the evacuation demonstration. It would be permissible for flight attendants to assess their exits for familiarity with the blocking signal.

(3) The significance of the 90-second time limit (for full-scale evacuations) or the 15-second time limit (for partial evacuations), as appropriate, should be discussed.

(4) The signal to be used by the FAA team leader for terminating (stopping) the demonstration such as an air horn, or some other clear audible means should be described. Any evacuation activity in progress must immediately cease with a "stop" signal.

(5) The importance of safety during the demonstration including crewmember responsibilities, safety observer duties, and limitations should be emphasized.

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B. The company's evacuation demonstration coordinator should provide passenger participants with the following information before the demonstration:

- (1) The purpose of the demonstration is to evaluate how quickly the aircraft can be safely evacuated.
- (2) Passenger participants must be attentive to the flight attendant's instructions.
- (3) Individual safety is not to be compromised at any time during the demonstration.

C. The FAA team leader shall brief the FAA team as follows:

- State the objectives of the demonstration.
- Review the initiation signal.
- Review observer assignments with regard to exits to be used or blocked.
- Review the signal which stops the demonstration.

- Remind the team members not to discuss the results of their observations with persons other than the team leader.

1729. CONDUCTING THE DEMONSTRATION.

A. The team leader shall ensure all predemonstration briefings and inspections are conducted before the actual demonstration. The following sequence of events represents an acceptable means, derived from past experience, for conducting the demonstration.

FULL-SCALE EVACUATION DEMONSTRATION

B. The team leader will advise the operator to board the passengers, as routinely as possible, and prepare for departure. No passenger may be assigned a specific seat unless the FAA team determines such assignments are in accordance with the operator's normal boarding procedures.

C. For both full-scale and partial demonstrations flight attendants will accomplish the following:

(1) Prepare for a normal departure in accordance with the operator's procedures, including closing and securing all exits, galleys, and arming the emergency evacu-

ation system for takeoff.

(2) Conduct a passenger briefing in accordance with § 121.571 and the company's procedures.

(3) Be seated at their assigned positions with their

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D. When the preceding actions are completed, the FAA team will accomplish the following:

(1) Will place a reasonable amount of carry-on baggage, blankets, pillows, and items of clothing in the aisles and emergency exit access ways to create minor obstructions. Carry-on luggage such as small suitcases, gym bags, airplane flight bags, and briefcases should be placed in the main aisles with one bag per seat row for each aisle. Also, some bags should be placed in the aisles and passageways, and pillows and blankets should be scattered in the main aisles.

(2) The FAA team then ensures that each external door and exit, and each internal door or curtain is in position for a normal takeoff.

accomplish all tasks on appropriate checklists and configure the airplane for a normal takeoff. The flightcrew must be seated in their normal positions with their restraint systems fastened.

E. Before the initiation signal, the flightcrew shall

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NOTE: If the operator's emergency evacuation procedures require the wing flaps to be placed in the fully extended position, the airplane will be so configured before the demonstration and the stands or ramps (if used) positioned. The wing flaps must not be repositioned until after the demonstration.

F. After completing all required pre-takeoff actions, the captain shall inform the FAA team leader (who is positioned forward of the nose of the aircraft), by ground interphone, that the aircraft is ready for takeoff.

upon the method approved by the FAA (as in the operator's plan) the team leader shall inform the company evacuation demonstration coordinator to initiate the demonstration.

G. Once the FAA team leader has been told that the crew is ready, he/she must make certain all FAA team members and company safety observers (if used) are ready and in position. The team leader will then issue a warning signal (air horn or whistle blast) which should precede the initiation signal by approximately 30 seconds. Depending

H. The FAA team leader will coordinate the timekeeping with two stopwatches (a primary and a back-up). The timing will begin when the external airplane lights extinguish. The timing will end when all selected exits/slides or slide/rafts are ready for use. At the end of the appropriate time period (90 or 15 seconds, as appropriate) the team leader shall issue a clear, audible signal terminating the demonstration.

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I. Each FAA observer, assigned to exits which are to be used, must count the number of passenger participants as they exit the airplane. After the termination signal, each observer shall determine that no other participating passenger or crewmembers remain on board the airplane or use the exits. Any participating passengers or crewmembers remaining on board or using an exit or a slide (evacuation device) after the termination signal constitutes an unsatisfactory demonstration.

J. For a partial demonstration, each FAA observer assigned to exits which are to be used is responsible for determining that his/her assigned exit was opened and each slide or slideraft (as applicable) was ready for use before the team leader's termination signal. Any exit, slide, or slideraft that was not ready for use before the termination signal constitutes an unsatisfactory demonstration.

K. The FAA team members assigned to the cabin shall ensure that all required equipment worked properly (for

example, floor proximity lighting, emergency exit lights).

L. It is important that team members do not discuss the results of their observations with company personnel or passenger participants. After the demonstration has been terminated, the FAA team shall confer immediately on the observation of each team member and the overall conduct of the demonstration before advising the operator of the demonstration results.

1730. - 1734. RESERVED.

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